REMARKS

Claims 1-5 and 8-13 are now pending in the application. Claims 6 and 7 are withdrawn. The amendments to the claims contained herein are of equivalent scope as originally filed and, thus, are not a narrowing amendment. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTIONS UNDER 35 U.S.C. § 102 AND §103

Claims 1, 2, 4, 5, 8 and 10 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Sulavuori et al. (U.S. Pat. No. 5,636,264). Claims 3 and 9 stand rejected under 35 U.S.C. §103(a) over Sulavuori in view of admitted prior art. Claim 11 is rejected under 35 U.S.C. §103(a) as being unpatentable over Sulavuori in view of any one of Law (U.S. Pat. No. 6,064,699), Smith III et al. (U.S. Pat. No. 4,627,090) or Dean et al. (U.S. Pat. No. 5,008,964). These rejections are respectfully traversed. As will be more fully explained below, applicants' invention employs a unique technique not employed in the art of record.

The Examiner asserts that continuously variable slope delta modulation (CVSD) is a noise shaping method (see page 8, line 20 to page 9, line 2 of the Office Action). Applicant disagrees with the Examiner's assertion. As can be understood from the explanations shown below, the CVSD is different from the noise shaping method.

The Wikipedia entry cited by the Examiner with respect to noise shaping (i.e., reference U cited by the Examiner) states that ". . . noise shaping is a bit reduction technique used to minimize quantization error" (emphasis added: see page 1, first paragraph, line 1 of Wikipedia entry). As is well known in the art, $\Delta\Sigma$ modulators

decrease a quantization error in a frequency range which is lower than a sampling frequency of the ΔΣ modulators, and thus the ΔΣ modulators perform noise shaping.

On the other hand, when a signal converted by means of Δ modulators such as those employing CVSD is demodulated at a receiver side, a quantization error having an original spectrum is also demodulated. Therefore, the CVSD is not noise shaping.

In order to facilitate the Examiner's understanding, Applicant has prepared the following explanations based on an excerpt from an English reference ("Understanding Delta-Sigma Data Converters", Richard Schreier et al., Wiley-IEEE Press, November 2004, pp. 4-10), which is well known in the art of A/D converters.

An output signal of Δ modulators is expressed by Equation (1.2) shown below.

$$v(n) = [\, u(n) - u(n-1)] + [\, e(n) - e(n-1)] \qquad (1.2)$$

where *v* denotes an output signal, *u* denotes an input signal, and *e* denotes a quantization error.

That is the Δ modulators output a difference value (i.e., differential value) of the input signal and a difference value (i.e., differential value) of the quantization error. The original input signal can be demodulated by inputting this output signal to an integrator. However, in demodulating the original input signal, the original quantization error is restored at the same time. That is, the ΔΣ modulators do not minimize the quantization error, and thus they do not perform noise shaping.

By the way, as stated above, an integrator is required to demodulate an output signal of Δ modulators such as those employing the CVSD. In contrast, as explained in the reference, an output signal of ΔΣ modulators is expressed by Equation (1.3) shown below.

$$v(n) = u(n-1) + [\, e(n) - e(n-1)] \qquad (1.3)$$

That is, the output signal includes an input signal itself. Therefore, no integrators are required in demodulating an output signal of the $\Delta\Sigma$ modulators (noise shaping). It is sufficient for a receiver to provide only a low pass filter that eliminates a quantization error in a frequency range which is higher than a sampling frequency.

As described above, the CVSD employed by Sulavuori is different from the noise shaping method of the invention as recited in independent Claims 1 and 2 (hereinafter referred to as "the present invention"). Therefore, the present invention would not have been anticipated by Sulavuori. In addition, dependent Claims 3-5 and 8-13 would not have been anticipated by Sulavuori at least by virtue of their dependency to the independent claims.

Moreover, the present invention can provide the foregoing advantage of requiring no integrators, while Sulavuori has the foregoing disadvantage of requiring an integrator. The other cited references do not remedy the deficiency of Sulavuori. Therefore, although not pointed out by the Examiner, the present invention would not have been obvious from not only Sulavuori but also any combinations of Sulavuori and the other cited references. In addition, dependent Claims 3-5 and 8-13 would not have been obvious therefrom at least by virtue of their dependency to the independent claims

Please note that in order to more clarify the differences between the noise shaping method of the present invention and the CVSD of Sulavuori, the recitation of Claim 1 relating to the receiving side and the recitation of a drive section in Claim 8 have been amended. As a result, it becomes clearer that the receiver side of the present invention does not require an integrator.

ADDITIONAL COMMENT AND DECLARATION UNDER 37 C.F.R. 1.132

In the Office Action dated November 28, 2007, the Examiner suggested at page 7, that applicant might submit a Declaration under 37 C.F.R 1.132 to address the Examiner's point that applicant's arguments had made reference to certain diagrams that were not

part of the record.

Accordingly, applicant is herewith providing his Declaration, which provides authentication and explanation for the referenced documents. In addition, this Declaration provides additional evidence in the form of applicant's testimony. The Examiner is respectfully requested to consider this Declaration as further evidence why the invention is not anticipated or rendered obvious by the CVSD technique of Sulavuori.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 08-0750, under Order No. 5259-000031/US from which the undersigned is authorized to draw.

Dated: Feb 27, 2008

Respectfully submitted,

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